

Appl. No. 10/624,236
Docket No.: H1535-00019
Reply to Office Action dated November 8, 2004

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A metal stamping system comprising:
a press including a ram having a bulbous protrusion projecting outwardly from an end;
an upper die shoe including (i) a recess formed in a top surface, said recess being complementary to said bulbous protrusion, and (ii) a plurality of guide posts arranged in a pattern and projecting outwardly from a bottom surface, wherein said bulbous protrusion is received within said complementary recess;
a lower die shoe positioned in confronting relation to said surface and including a first plurality of open ended tubular guide bushings each having a first anti-friction bearing assembly positioned within a central passageway, and each located so as to receive a corresponding one of said guide posts; and
a stripper-plate positioned between said upper die shoe and said lower die shoe, including a second plurality of open-ended tubular guide bushings each having an outer surface and an inner surface and each projecting outwardly toward said lower die shoe in a pattern corresponding to said pattern of guide posts such that each of said first anti-friction bearing assemblies slidingly engages an outer surface of a corresponding one of said second open

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ended guide bushing, wherein each of said second plurality of open-ended guide bushings includes a second anti-friction bearing assembly positioned on said inner surface so as to engage a corresponding one of said guide posts; and
spring means for separating said upper shoe from said lower shoe after each downward stroke of said ram.

2. (Previously Presented) A metal stamping system according to claim 1 wherein each of said open-ended tubular guide bushings includes an annular shoulder that projects radially outwardly from a top end.

3. (Previously Presented) A metal stamping system according to claim 1 wherein each of said open-ended tubular guide bushings comprises an internal passageway defined by a hardened surface and sized to slidingly accept one of said first anti-friction bearing assemblies.

4. (Previously Presented) A metal stamping system according to claim 3 wherein each of said first anti-friction bearing assemblies includes a plurality of circularly and longitudinally spaced ball bearings that are each confined in a bearing cage, wherein said ball bearings are preloaded against said hardened surface.

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5. (Previously Presented) A metal stamping system according to claim 3 wherein each of said first anti-friction bearing assemblies comprises an open ended tubular cylinder.

6. (Previously Presented) A metal stamping system according to claim 1 wherein each of said second anti-friction bearing assemblies includes a plurality of circularly and longitudinally spaced ball bearings that are each confined in a bearing cage, wherein said ball bearings are preloaded against a surface of one of said open-ended tubular guide bushings.

7. (Previously Presented) A metal stamping system according to claim 6 wherein each of said second anti-friction bearing assemblies include a bearing cage that is cylindrical.

8. (Previously Presented) A metal stamping system according to claim 1 wherein said bulbous protrusion projects outwardly from an intermediate plate positioned on an end of said ram.

9. (Cancelled)

10. (Previously Presented) A die set to be reciprocatingly driven in a stamping press comprising:

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an upper die shoe including (i) a recess formed in a top surface, said recess being complementary to a bulbous protrusion located on a ram portion of said press, and (ii) a plurality of guide posts arranged in a pattern and projecting outwardly from a bottom surface, wherein said bulbous protrusion is received within said complementary recess;

a lower die shoe positioned in confronting relation to said surface and including a first plurality of open ended tubular guide bushings each having a first anti-friction bearing assembly positioned within a central passageway, and each located so as to receive a corresponding one of said guide posts; and

a stripper-plate positioned between said upper die shoe and said lower die shoe, including a second plurality of open-ended tubular guide bushings each having an outer surface and an inner surface and each projecting outwardly toward said lower die shoe in a pattern corresponding to said pattern of guide posts such that each of said first anti-friction bearing assemblies slidably engages an outer surface of a corresponding one of said second open ended guide bushing, wherein each of said second plurality of open-ended guide bushings includes a second anti-friction bearing assembly positioned on said inner surface so as to engage a corresponding one of said guide posts.

11. (Previously Presented) A die set according to claim 10 wherein said upper die shoe includes at least two of said guide posts that are each received within one of said first open ended tubular guide bushings.

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12. (Previously Presented) A die set according to claim 10 wherein said upper die shoe includes six guide posts wherein each are received within one of said first open ended tubular guide bushings.

13. (Previously Presented) A die set according to claim 10 wherein each guide post includes a recess defined at a free end, having a spring mounted therein for separating said upper shoe from said lower shoe after each downward stroke of said ram.

14. (Previously Presented) A die set according to claim 10 wherein said stripper-plate includes a pattern of peripheral through-bores arranged in corresponding relation to the positions of said guide posts and said first plurality of open ended tubular guide bushings.

15. (Previously Presented) A die set according to claim 10 wherein each of said second plurality of open-ended tubular guide bushings includes an internal passageway and an annular shoulder that projects radially outwardly from a top end.

16. (Previously Presented) A die set according to claim 15 wherein each of said internal passageways is defined by a hardened surface, and is sized

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to slidingly receive a first anti-friction bearing assembly and one of said guide posts.

17. (Previously Presented) A die set according to claim 16 wherein each of said first anti-friction bearing assemblies includes a plurality of circularly and longitudinally spaced ball bearings that are each confined in a bearing cage, wherein said ball bearings are preloaded against a said hardened surface.

18. (Previously Presented) A die set according to claim 17 wherein said bearing cage is cylindrical, and sized so as to longitudinally enclose and encircle one of said guide posts.

19. (Previously Presented) A die set according to claim 17 wherein each of said first anti-friction bearing assemblies is located between said guide post and bearing cage so as to allow for a prestressed loading of said ball bearings against an outer surface of said guide post.

20. (Previously Presented) A die set according to claim 10 wherein each of said second anti-friction bearing assemblies includes a plurality of circularly and longitudinally spaced ball bearings that are each confined in a bearing cage.

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21. (Previously Presented) A die set according to claim 20 wherein each of said bearing cages is cylindrical, and each is sized so as to (i) longitudinally enclose and encircle one of said second plurality of open-ended tubular guide bushings, and (ii) be received within one of said first plurality of open ended tubular guide bushings.

22. (Cancelled)

23. (Previously Presented) A metal stamping system comprising:
a press including a ram having a bulbous protrusion projecting outwardly from an end;

an upper die shoe including (i) a recess formed in a top surface, said recess being complementary to and receiving said bulbous protrusion, and (ii) a plurality of guide posts arranged in a pattern and projecting outwardly from a bottom surface, wherein said bulbous protrusion is received within said complementary recess;

a lower die shoe positioned in confronting relation to said surface and including a first plurality of open ended tubular guide bushings each having a first anti-friction bearing assembly positioned within a central passageway, and each located so as to receive a corresponding one of said guide posts; and

a stripper-plate positioned between said upper die shoe and said lower die shoe, including a second plurality of open-ended tubular guide

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bushings each having an outer surface and an inner surface and each projecting outwardly toward said lower die shoe in a pattern corresponding to said pattern of guide posts such that each of said first anti-friction bearing assemblies slidably engages an outer surface of a corresponding one of said second open ended guide bushing, wherein each of said second plurality of open-ended guide bushings includes a second anti-friction bearing assembly positioned on said inner surface so as to engage a corresponding one of said guide posts; and
spring means for separating said upper shoe from said lower shoe after each downward stroke of said ram.

24. (Previously Presented) A die set to be reciprocatingly driven in a stamping press comprising:

an upper die shoe including (i) a recess formed in a top surface, said recess being complementary to and receiving a bulbous protrusion located on a ram portion of said press, and (ii) a plurality of guide posts arranged in a pattern and projecting outwardly from a bottom surface, wherein said bulbous protrusion is received within said complementary recess;

a lower die shoe positioned in confronting relation to said surface and including a first plurality of open ended tubular guide bushings each having a first anti-friction bearing assembly positioned within a central passageway, and each located so as to receive a corresponding one of said guide posts; and

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a stripper-plate positioned between said upper die shoe and said lower die shoe, including a second plurality of open-ended tubular guide bushings each having an outer surface and an inner surface and each projecting outwardly toward said lower die shoe in a pattern corresponding to said pattern of guide posts such that each of said first anti-friction bearing assemblies slidably engages an outer surface of a corresponding one of said second open ended guide bushing, wherein each of said second plurality of open-ended guide bushings includes a second anti-friction bearing assembly positioned on said inner surface so as to engage a corresponding one of said guide posts.

25. (Cancelled)